

Date: January 24, 2022

Vendor Name: LOYTEC electronics GmbH

Product Name: L-INX Automation Server, L-ROC Room Controller, L-GATE Universal Gateway, L-IOB I/O, L-IP Router

Product Model Number: LINX-15X/20X/21X/22X, LGATE-902/95X, LROC-10X, LROC-40X, LIOB-55X, LIOB-58X, LIOB-59X, LIOB-AIR, LIP-ME20XC

Applications Software Version: V7

Firmware Revision: 7.6

BACnet Protocol Revision: 135-2020 (1.16)

Product Description:

This product implements a BACnet gateway and freely programmable BACnet controller. It comes in various models providing different levels of additional functions to the same BACnet protocol interface. The L-GATE models are limited to the BACnet gateway function. The L-INX and L-ROC models contain the additional controller logic that can be extended with L-IOB I/O modules. The BACnet L-IOB I/O modules (LIOB-55X) include built-in physical I/Os and have no programmable logic, while the L-IOB I/O controllers (LIOB-58X, LIOB-59X, LIOB-AIR) also provide a controller function. The controller application is developed using an IEC-61131 or IEC-61499 compliant design tool. The L-ROC is a specialized room controller with flexible room assignment. Other protocols, I/Os and IEC logic variables are exposed as BACnet objects. For visualization this product implements an embedded BACnet OPC server (XML-DA and UA). The device also implements BACnet Schedule, Calendar, Trend Log, and Notification Class objects, including dynamic object creation and deletion. Alarming is based on intrinsic and/or algorithmic reporting. The device also implements client functions for simple objects, schedules, calendars, and alarms. The configuration of the device is accomplished by PC software. The product is equipped with a BACnet/IP and MS/TP interface. On the LINX-150, LINX-220, LROC-10X and LGATE-902/95X models, they can be configured for alternate usage. The LINX-151/153/154/203/213/215/221, LROC-10X, LIOB-585/586/588/589/591, and LIOB-AIR2/13 models contain a BACnet router between BACnet IP and MS/TP interfaces, slave proxy function, and a BBMD. The LGATE-902/95X, LIOB-480/481/482/483/484, and LIOB-AIR1/20 also contain a BBMD. All models allow mapping various protocols and physical I/O to BACnet objects and can act as a BACnet time master. The LIP-ME20X contain the router, slave proxy and BBMD functionality only and have multiple MS/TP interfaces. LIOB-55X do not have MS/TP nor do they have a BBMD or routing.

BACnet Standardized Device Profile (Annex L):

- BACnet Building Controller (B-BC)
- BACnet Router (B-RTR)¹
- BACnet Broadcast Management Device (B-BBMD)²

BACnet Interoperability Building Blocks Supported (Annex K):

Data Sharing – ReadProperty-A (DS-RP-A)
Data Sharing – ReadProperty-B (DS-RP-B)
Data Sharing – ReadPropertyMultiple-A (DS-RPM-A)
Data Sharing – ReadPropertyMultiple-B (DS-RPM-B)
Data Sharing – WriteProperty-A (DS-WP-A)
Data Sharing – WriteProperty-B (DS-WP-B)
Data Sharing – WritePropertyMultiple-B (DS-WPM-B)
Data Sharing – COV-A (DS-COV-A)
Data Sharing – COV-B (DS-COV-B)
Data Sharing – COVP-A (DS-COVP-A)
Data Sharing – COVP-B (DS-COVP-B)
Data Sharing – COV Unsubscribed-B (DS-COVU-B)
Alarm and Event Management – Notification Internal-B (AE-N-I-B)
Alarm and Event Management – Notification External-B (AE-N-E-B)

¹ LINX-151/153/154/203/213/215/221, LROC-10X, LIOB-585/586/588/589/591, LIOB-AIR2/13, LIP-ME20X

² Models as in footnote 1 plus LINX-150/202/212/220, LGATE-902/95X, LIOB-480/481/482/483/484, LIOB-AIR1/20

Alarm and Event Management – Acknowledge-B (AE-ACK-B)
Alarm and Event Management – Alarm Summary-B (AE-ASUM-B)
Alarm and Event Management – Enrollment Summary-B (AE-ESUM-B)
Alarm and Event Management – Information-B (AE-INFO-B)
Alarm and Event Management – Configurable Recipient Lists-B (AE-CRL-B)
Scheduling – Internal-B (SCHED-I-B)
Scheduling – External-B (SCHED-E-B)
Trending – Viewing and Modifying Trends Internal-B (T-VMT-I-B)
Trending – Viewing and Modifying Trends External-B (T-VMT-E-B)
Trending – Automated Trend Retrieval-B (T-ATR-B)
Device Management – Dynamic Device Binding-A (DM-DDB-A)
Device Management – Dynamic Device Binding-B (DM-DDB-B)
Device Management – Dynamic Object Binding-B (DM-DOB-B)
Device Management – DeviceCommunicationControl-B (DM-DCC-B)
Device Management – TimeSynchronization-A (DM-TS-A)
Device Management – TimeSynchronization-B (DM-TS-B)
Device Management – UTCTimeSynchronization-A (DM-UTC-A)
Device Management – UTCTimeSynchronization-B (DM-UTC-B)
Device Management – ReinitializeDevice-B (DM-RD-B)
Device Management – Backup and Restore (DM-BR-B)
Device Management – Restart A (DM-R-A)
Device Management – Restart B (DM-R-B)
Device Management – List Manipulation-B (DM-LM-B)
Device Management – Object Creation and Deletion-B (DM-OCD-B)
Device Management – Automatic Time Synchronization-A (DM-ATS-A)
Device Management – Slave Proxy-B (DM-SP-B)³
Network Management – Connection Establishment-A (NM-CE-A)³
Network Management – Router Configuration-B (NM-RC-B)³
Network Management – BBMD Configuration-B (NM-BBMDC-B)
Network Management – Foreign Device Registration-A (NM-FDR-A)
Gateway – Embedded Objects-B (GW-EO-B)

Segmentation Capability:

Segmented requests supported, window size: 4
Segmented responses supported, window size: 4

Standard Object Types Supported:

For all object types listed below the following applies if not stated otherwise:

- 1) Does not support the CreateObject and DeleteObject services
- 2) Properties Object_Name, Description support up to 64 characters
- 3) Includes the required properties as specified for the object type
- 4) All commandable objects support the Priority_Array and Relinquish_Default with 16 freely usable priorities
- 5) All Analog, Binary, Multi-state object types support COV subscriptions
- 6) Additional writeable properties: Description
- 7) No proprietary properties exist
- 8) No range restrictions exist

³ Available on the LINX-151/153/154/203/213/215/221, LROC-10X, LIOB-585/586/588/589/591, LIOB-AIR2/13, LIP-ME20X models only.

Device Object

List of optional properties supported:

Location, Description, Max_Segments_Accepted, APDU_Segment_Timeout, Max_Master⁴, Max_Info_Frames⁴, Active_COV_Subscriptions, Configuration_Files, Last_Restore_Time, Backup_Failure_Timeout, Local_Time, Local_Date, UTC_Offset, Daylight_Saving_Status, Last_Restart_Reason, Time_Of_Device_Restart, Restart_Notification_Recipients, Time_Synchronization_Recipients, UTC_Time_Synchronization_Recipients, Time_Synchronization_Interval, Align_Intervals, Interval_Offset, Serial_Number, Backup_Preparation_Time, Restore_Preparation_Time, Restore_Completion_Time, Backup_And_Restore_State, Slave_Proxy_Enable⁵, Manual_Slave_Address_Binding⁵, Auto_Slave_Discovery⁵, Slave_Address_Binding⁵

Analog Input, Analog Output, Analog Value

List of optional properties supported (as applies):

Description, Device_Type, Reliability, Update_Interval, Min_Pres_Value, Max_Pres_Value, Resolution, COV_Increment, Time_Delay, Notification_Class, Low_Limit, High_Limit, Deadband, Limit_Enable, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit, Interface_Value, Fault_High_Limit, Fault_Low_Limit

Binary Input, Binary Output, Binary Value

List of optional properties supported (as applies):

Description, Device_Type, Reliability, Active_Text, Inactive_Text, Time_Delay, Change_Of_State_Time, Change_Of_State_Count, Time_Of_State_Count_Reset, Elapsed_Active_Time, Time_of_Active_Time_Reset, Minimum_Off_Time, Minimum_On_Time, Notification_Class, Alarm_Value, Feedback_Value, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit, Interface_Value

Multi-State Input, Multi-state Output, Multi-State Value

List of optional properties supported (as applies):

Description, Device_Type, Reliability, State_Text, Time_Delay, Notification_Class, Alarm_Values, Fault_Values, Feedback_Values, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit, Interface_Value

Large Analog Value, Integer Value, Positive Integer Value

List of optional properties supported (as applies):

Description, Out_Of_Service, Event_State, Reliability, Min_Pres_Value, Max_Pres_Value, Resolution, COV_Increment, Time_Delay, Notification_Class, Low_Limit, High_Limit, Deadband, Limit_Enable, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit, Fault_High_Limit, Fault_Low_Limit

CharacterString Value, OctetString Value

List of optional properties supported (as applies):

Description, Out_Of_Service, Reliability

⁴ If device is operated with BACnet MS/TP enabled.

⁵ Available on the LINX-151/153/154/203/213/215/221, LROC-10X, LIOB-585/586/588/589/591, LIOB-AIR2/13, LIP-ME20X models only.

Notification Class Object, Schedule Object, Calendar Object

Supports the CreateObject and DeleteObject service.

List of optional properties supported (as applies):

Description, Weekly_Schedule, Exception_Schedule

Object limit: 32 Notification Class, 100 Schedule, 25 Calendar objects.

Event Enrollment Object

Supports the CreateObject and DeleteObject service.

List of optional properties supported (as applies):

Description, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit

Trend Log Object

Supports the CreateObject and DeleteObject service.

List of optional properties supported:

Description, Start_Time, Stop_Time, Log_DeviceObjectProperty, Log_Interval, COV_Resubscription_Interval, Client_COV_Increment, Align_Intervals, Interval_Offset, Trigger, Notification_Threshold, Records_Since_Notification, Last_Notify_Record, Notification_Class, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Detection_Enable, Reliability

Object limit: 256 Trend Log objects. There is an aggregated limit of 4,000,000 log records over all Trend Log objects.

Accumulator

List of optional properties supported:

Description, Device_Type, Reliability, Value_Change_Time, Value_Before_Change, Value_Set, Pulse_Rate, Limit_Monitoring_Interval, Time_Delay, Notification_Class, Low_Limit, High_Limit, Limit_Enable, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit, Fault_High_Limit, Fault_Low_Limit

Pulse Converter

List of optional properties supported:

Description, Input_Reference, Reliability, COV_Increment, COV_Period, Time_Delay, Notification_Class, Low_Limit, High_Limit, Deadband, Limit_Enable, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit

Loop

List of optional properties supported:

Description, Reliability, COV_Increment, Update_Interval, Proportional_Constant, Proportional_Constant_Units, Integral_Constant, Integral_Constant_Units, Derivative_Constant, Derivative_Constant_Units, Bias, Maximum_Output, Minimum_Output, Time_Delay, Notification_Class, Error_Limit, Deadband, Event_Enable, Acked_Transitions, Notify_Type, Event_Time_Stamps, Event_Message_Texts, Event_Message_Texts_Config, Event_Detection_Enable, Event_Algorithm_Inhibit, Event_Algorithm_Inhibit_Ref, Time_Delay_Normal, Reliability_Evaluation_Inhibit, Low_Diff_Limit

File Object

List of optional properties supported:

Description

Object limit: 1 File object. This object is used for configuration backup and restore.

Data Link Layer Options:

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200
- MS/TP master (Clause 9) supports extended length BACnet frames

Device Address Binding:

Static device address binding is supported.

Networking Options:

- Router, Clause 6 – MS/TP to BACnet/IP⁶
- Annex H, BACnet Tunneling Router over IP

Character Sets Supported:

The device is configurable for one of the following character sets at a time. It does not support them simultaneously.

- | | | |
|---|---|--|
| <input checked="" type="checkbox"/> ANSI X3.4/UTF-8 | <input type="checkbox"/> IBM™/Microsoft™ DBCS | <input checked="" type="checkbox"/> ISO 8859-1 |
| <input checked="" type="checkbox"/> ISO 10646 (UCS-2) | <input type="checkbox"/> ISO 10646 (UCS-4) | <input type="checkbox"/> JIS C 6226 |

If this product is a communication gateway, describe the non-BACnet equipment/network(s) that the gateway supports:

The device contains an embedded OPC server. The BACnet objects and properties are exposed to the OPC server. The BACnet server objects, client functions and OPC data tags are created by configuration software. By default, OPC data tags are named as their original BACnet objects. OPC tags can be organized in a hierarchy. Additional BACnet properties such as Description, Units, Max_Pres_Value, Min_Pres_Value, Resolution, Number_Of_States, and State_Text are also reflected in the OPC data tags. Properties updated during run-time by the OPC server are Present_Value, Status_Flags, Reliability, Out_Of_Service. Trend Log, Schedule, Calendar and Notification Class Objects are exposed to the OPC server as a collection of OPC tags. Also, Modbus and M-Bus data points as well as L-IOB I/Os can be mapped to BACnet objects. On the LINX-15X, LROC-10X and LGATE-902/95X models also CEA-709.1 data points (NVs and CPs) can be mapped to BACnet objects.

Additional Information and Contact:

Further Information, a detailed User Manual and firmware updates can be obtained from our website <http://www.loytec.com>.

For information and technical support please contact us at the following address:

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⁶ Available on the LINX-151/153/154/203/213/215/221, LROC-10X, LIP-ME20X, LIOB-585/586/588/589/591, LIOB-AIR2/13 models only.